IBM's Vision of the On Demand Enterprise

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Abstract

Whether it's called the on demand enterprise, the adaptive enterprise, the agile enterprise, the real time enterprise or the zero latency enterprise, it is generally acknowledged that we are at the cusp of the next major wave of the co-evolution of business and information technology (IT). This paper presents IBM's vision on an on demand enterprise. Because on demand is fundamentally a statement about the future state of business, this paper is much less about technology than it is about the evolution of enterprises as they exploit IT.

The evolving enterprise not only exploits IT but places new demands on IT suppliers. IBM's response to these emerging requirements is what we call ebusiness on demand. This paper does not specifically address our ebusiness on demand initiatives, but details can be found in many other papers, presentations and www.ibm.com.

The Co-evolution of Business and Technology

At IBM, we call it the on demand business. Others call it the adaptive enterprise, the agile enterprise, the real time enterprise or the zero latency enterprise. These are all simply labels for something being sensed by the information technology (IT) industry – a sense that we are entering a fundamentally new phase in the constant co-evolution of IT and business. Evolving IT enables new business models and new scale to existing models; evolving business requirements thrust new requirements on the IT industry. While this co-evolution has taken a breather for the past couple of years due to the dot com bust and economic malaise, co-evolution is again driving renewed growth.

So What's New, Really?

There are many factors at work; the major factors include the following:

1. A rude awakening of volatility unseen since the depression. As Hamel and Valkingren note in their recent HBR article[1], "our world is becoming more turbulent faster than firms are becoming more resilient." Becoming more resilient, and doing so faster, has become a major focus for IT.

2. The "boom and bust" of IT precipitated by the dot com bubble has forced a new sense of "reality" into IT organizations and a healthy skepticism for every "new new thing" in technology.

3. As we reflect on the current economic recovery, we note two attributes of this recovery, both in our view results of IT investment:

   - To date, it has been a jobless recovery – productivity is being driven to higher and higher levels, largely because of IT investment and the resulting change in capital/ labor trade-offs.

   - To date, producers have been unable to raise prices. The Internet has driven a level of transparency that has dramatically reduced the seller's traditional information advantage.

4. The question, "Does IT Matter" raised by Nick Carr in a recent HBR issue[2] brought to the fore some very real issues, namely the increasing rate of commoditization of IT and the increasing difficulty of attaining enduring competitive advantage through IT innovation. Should IT lead or be a fast follower?

These four issues, and probably others, have motivated CIO's and their organizations to seek new models to drive efficiencies, foster innovation and become more resilient. At the same time, there are key enablers creating new opportunities:

1. Most importantly, "what's new" is that we have a communications and computing infrastructure that enables inter-enterprise communication with the speed and intimacy previously confined to intra-enterprise communication. This is not just about "moving bits" between enterprises in a value chain, but about moving electronic documents coded in industry standard ways with XML.

   The effect of this cannot be overestimated. The ease and ubiquity of inter-enterprise communication dramatically lowers transaction costs between firms. This notion was explored by Hagel and Singer in their 1999 HBR article entitled, "Unbundling the Corporation."[3] In many ways, this article was a tutorial about Coase's Law – firms should only do what they can do more efficiently than others, and should outsource what can be done more efficiently by others, after consideration of transaction costs incurred in working with outside suppliers. As transaction costs decline due to a global connectivity platform, the drive to outsource business processes will increase. This industry deconstruction and reconstruction will likely be the major disruptive change in business designs over the next several years.

2. There is a renewed recognition of the necessary linkage between business strategy, business processes and IT. Indeed, many observers see this as an issue of co-evolution between business and IT, acknowledging the codependent nature of business and IT. The current focus on business process modeling, business process monitoring, etc. is evidence of this change. It has become abundantly clear that IT advancements enable new business designs, and that these evolving business designs drive new requirements for IT. In many ways, the correct response to Nicholas Carr's charge that IT doesn't matter is that it never did – IT is an enabler; it never was and never should be and end in and of itself. In fact, the dot com period can be viewed as a singular period when IT did become an end in and of itself, and the results were disastrous.

It is this confluence of economic drivers and enabling technology that leads many to believe that we are at an inflection point in the co-evolution of business and IT. Whether we choose to refer to this future state as an on demand business, the adaptive enterprise, the agile enterprise, the real-time enterprise or the zero latency enterprise, all industry players largely share a vision of the next major stage of evolution in IT. What will separate the winners from the losers will not be some much the vision as the ability to broadly execute against that vision.

The On Demand Vision

Just what is that vision? It can be summarized as follows:

1. End-to-end truly is end to end. In many ways, the major effort of IT organizations has been integration of subsystems into larger and larger systems. The advent or ERP systems is a good example of integrating what were previously disparate systems for general ledger, accounts receivable, accounts payable, payroll, etc.

In almost all cases, the scope of this integration was within a firm – what we refer to as "within the four walls" (of the firm). Historically, we sought to integrate and to optimize within the scope of a firm. Most enterprises have a done a good job of integrating within the firm and thereby taking out cost. The residual waste and inefficiencies, for the most part, lies in the "white space" between one firm's processes and the processes of other firms with which in interacts. Going forward, end-to-end refers top the entire supply chain and demand chain. The scope of integration and optimization is no longer intra-firm but inter-firm. This is possible because the enabling technology exists today in basic form and the necessary enhancements for secure transactions are being substantially improved. This enabling technology consists of the Internet and the higher level protocols to implement a services oriented architecture using web services protocols.

2. A constant rebalancing of fixed and variable costs. In times of relative predictability or certainty, firms attempt to minimize costs by making fixed commitments – lower fixed costs per unit are favored over higher variable costs. Volatility teaches us over and over again that it is very hard to shed costs as fast as revenues decline. In today's world of higher volatility, firms now seek to optimize long term costs by rebalancing fixed and variable costs, with more "appetite" for variable costs. Variable costs structures are, by definition, more responsive to fluctuating demand. The old trade-off of higher variable costs for the benefit of responsiveness is not necessarily the order of the day, however. In many cases, firms are moving from fixed costs to variable costs by outsourcing business process to suppliers who have the benefit of demand aggregation and can deliver the same level of service at a lower cost, and on a variable basis, to boot. Historically, the transaction costs of outsourcing consumed most or all of these savings, but this is less and less the case.

   In rebalancing fixed vs. variable costs, one place to look is certainly IT assets. IT suppliers are introducing a variety of plans for flexible acquisition and deployment, providing more of a "pay as you go" model for customers. The asset can be owned by the customer or the supplier, it can reside on the customer's premise or the supplier's premise, it can be paid for by the barrel of by the drink, the charging metric can be IT based (e.g., MIPS or terabyes) or business based (e.g., policies issued) – these are all variables in the new equation of IT asset acquisition.

3. As firms consider new process outsourcing arrangements, it is becoming clear that this is very much a continuum, allowing a firm to decide how much to insource or outsource. One might choose to outsource an entire business process. One might choose to keep the process in house but outsource the application via an application hosting arrangement. One might choose to host the application but outsource a component of the application that is accessed as web service (for example, an insurance firm might well maintain its own underwriting application but access actuarial analysis via an external web service). This is perhaps best

exhibited with the simple process of preparing a birthday cake. Mom can purchase all the ingredients and bake the cake "from scratch." Today, more moms simply but a cake mix. Some moms buy the birthday cake at the bakery, and some outsource the entire birthday party to someone else, and the birthday cake is included. [4]

While we sometimes think of outsourcing as something new, it is as old as the notion of division of labor. Indeed, as noted by Prof. Charles Fine in Clockspeed[5], how a firm manages its supply chain is, at its essence, a series of decisions about what to make within the firm and what to acquire from others (outsource). Decisions to acquire raw materials, or to acquire subassemblies instead of the component parts – these are insourcing vs. outsourcing decisions. "Vertical integration" is a strategy to outsource less and insource more. The virtual enterprise is a strategy to outsource more and insource less. They are both subject to Coase's Law – do what others cannot do for you less expensively. Today's interest in outsourcing is not something fundamentally new, but rather a natural evolution of the nature of the firm accelerated by rapidly declining inter-firm transaction costs.

4. As a result of business process outsourcing enabled by a robust communications and computing infrastructure, we will see industry unbundling and rebundling [6], also referred to as industry deconstruction and reconstruction. As firms move away from vertical integration, the value chain gets "chopped up" with specialist firms focusing on part of the value chain and acting as a supplier to customer facing firms that need to access this part of the value chain. Consider the evolution of the mortgage banking industry, or financial services in general, for a good example of industry deconstruction and reconstruction.

5. There will be a much tighter linkage of business strategy to IT. For many firms this will not be a step change but a natural part of the evolution and maturation of IT, dating back to when the "MIS executive" became a "C level executive".

For each of the points set forth above, one could observe that these are evolutionary changes and not revolutionary changes. This observation is correct, but it is the confluence of these forces that will, in our view, define a new era in the co-evolution of business and IT.

It is worth focusing on the evolutionary nature of on demand. Some have interpreted on demand as "just outsourcing" or "the utility model" or "new financing schemes" or "a new term for business process reengineering" or as "nothing really new." On demand is fundamentally about the state of a business and its readiness to respond to the challenges thrust upon it. It is an evolution and in that sense is "nothing new." Outsourcing, computing utilities, flexible acquisition and deployment of IT assets, and business process reengineering unconstrained by the "four walls" of the firm are all arrows in the quiver of an on demand business.

Ultimately, what firms care about is innovating and maximizing organizational productivity. As firms have attempted to optimize against these goals, they first optimized at the business process level. Then they integrated across these resulting "stovepipes" to achieve some form of enterprise level optimization. Now the challenge is to look beyond the firm and optimize across the entire value chain and value net. To accomplish this, firms must have a far more dynamic posture in virtually everything they do – just in time applied to everything. This is the essence of the on demand era.

It's interesting to note that from the perspective of a consumer, we pretty much live in an on demand world. We go to the grocery store when we want and "demand" milk, we go to the clothing shop and "demand" clothes, etc. There are some trade-offs we make to live in this on demand world, and the most fundamental trade-off is one of standardization. I can demand a quart or a half gallon of whole milk or 2% milk or skim milk, but not a three quart container of 3% milk, for example.

How does this on demand world work at the consumer level? It works because suppliers have the benefit of demand aggregation. While I may or may not walk into the grocery store on any given day to purchase a half gallon of 2% milk, in aggregate the number of people who will walk into a specific grocery store on a Wednesday in June is fairly predictable, and the increased cost of it being fairly predictable but not absolutely certain is part of the cost structure passed on to consumers.

In order to support this "on demand' point of presence, firms invest in a substantial amount of slack capacity. As you move up the supply chain (away from the end customer), the system gets less and less on demand, and as Fine notes in Clockspeed, more and more volatile in terms of business cycles. The major manifestation of slack is, of course, inventory - finished goods inventory, semi-finished goods, work-in-process, raw materials inventory. More and more, a measure of on demand will be reduced inventory. In that sense, it is a generalization of the just-in-time discipline developed in the automotive industry.

To summarize, we view an on demand enterprise as an enterprise whose business processes -- integrated end-to-end across the company and with key partners, suppliers and customers – can respond with speed to any customer demand, market opportunity or external threat. At IBM, we refer to an on demand business as one that is focused, responsive, resilient and variable. The IT operating environment required to support an on demand business must be open, virtualized, integrated and autonomic.

The Evolution of the IT Industry in Support of On Demand

So far, we have focused on the enterprise and the evolution of the enterprise toward on demand. Let's now turn our attention to the IT industry and its role. In order to manage complexity, the IT industry focuses on architecture – the specification of interfaces. This often manifests itself in a "stack" - a collection of functions that build on each other. For the better part of two decades, IT has focused on the build out of a communications stack based on the OSI model (Open Systems Interconnection). This 7 layer model or stack

starts with the physical layer and progresses up through layers referred to as data link, network, transport, session, presentation and application. It fundamentally specifies how a program running on computer A communicates across a network with a program running on computer B. Almost all of the focus has been on the lower five layers of that stack (up through the session layer). The architecture drives a set of standards. With respect to the Internet and most intranets, those standards deal with RJ45 plugs, Ethernet protocols, TCP/IP, http, html, and now XML, Soap and numerous other protocols. It is a history or working our way up the stack, from the lowest layers of Ethernet protocols for competing to send a packet from point A to point B, up through XML, which specifies how a document such as a purchase order should be coded so that it will be meaningful to the sender and receiver.

That evolution continues. At IBM, we refer to the on demand operating environment as the set of IT capabilities needed to support an on demand enterprise. From an architectural standpoint, we have defined a virtualization layer, an automation layer and an integration layer. The details of this architecture are not the subject of this paper, but can be found in numerous other IBM papers and presentations.

The key point to be made here is that the IT industry is redefining this traditional 7 layer stack into a more business oriented 4 layer stack. These layers, starting from the bottom, are IT infrastructure, application infrastructure (including the application), business process execution and business design. The traditional 7 layer model is subsumed in the first two layers of this new on demand model. This new model clearly acknowledges the stronger linkage of business strategy with IT.

Business design addresses the fundamental strategic decisions faced by a firm – where value is to be captured, the scope of activities, etc. Once a strategy is set, firms seek scale and predictability of outcomes by defining and managing business processes – the order to cash process or the product development process, for example. At any moment in time, there are many instances of a business process – many orders being processed, many development projects underway. Each of these processes depends to some extent on IT applications. The order to cash process might rely upon an order entry application, a pick and ship application, a billing application and an accounts receivable application (or they may be functions within an ERP application). These applications are enabled and supported by applications infrastructure (e.g., database systems, web application servers, collaboration tools) and underlying IT infrastructure (e.g., servers, storage, networks).

The relationship of a business process to the underlying applications is critically important. From an IT perspective, a transaction is typically viewed at a fairly microscopic level – posting a payment, updating an address record, etc. From a business perspective, however, a transaction often occurs over a very long period of time and involves many IT transactions. For example, the order to cash process might take weeks for a specific order. Business processes in most large enterprises have evolved over a long period of time in response to many demands, and they are complex and oftentimes fragile and inflexible. A new generation of business modeling tools has recently been introduced by a number of suppliers, including IBM, to precisely model these processes

and monitor their execution. An on demand enterprise will be very focused on analyzing business processes <u>across</u> the value chain, optimizing them, and implement inter-enterprise IT systems to optimize these processes. Indeed, it is at the business process where business strategy and IT intersect; firms that best understand this will lead the next wave of evolution.

This four layer model is also a very useful way to think about what a firm can outsource. The unit of outsourcing is a business process, function or component. In many cases, a firm will choose to insource the business design, business process execution, application infrastructure and IT infrastructure. However, for a particular business component, the firm can choose to outsource just the IT infrastructure, or the IT and application infrastructure via an application hosting arrangement, or the IT and application infrastructure plus the business process execution via a business process outsourcing (BPO) relationship, or the entire stack through a business transformation outsourcing (BTO) relationship. In the case of BPO, the outsourcer commits to execute the process as it is already defined. In the case of BTO, the outsourcer commits to transform the business process by optimizing the business design. Whatever the level of insourcing or outsourcing, the IT function is likely to be intimately involved in the decision making and the subsequent supplier management.

Summary

We are on the cusp on the next wave of IT innovation and integration with business. Here is what to expect:

1. There will be a much tighter relationship between business strategy and IT as IT redefines itself in terms of the new IT/business stack described above.

2. We will see industry restructuring in the form of deconstruction and reconstruction as firms respond to declining inter-firm transaction costs by outsourcing more and more business functions.

3. The Web will evolve from a web of relatively passive pages to a web of very active business components delivered through web services and a services oriented architecture. From an IT perspective, we've seen this before – an evolution from "people pecking at programs" to "programs pecking at programs" (LU2 to LU 6.2 for those familiar with IBM's SNA networking system).

4. We will move one step closer to the virtual enterprise.

5. As always, culture matters and for many firms will be the gating issue.

Our vision on an on demand enterprise will surely continue to mature as we engage with customers and conduct our own research. Likewise, our ebusiness on demand offerings will respond to evolving customer requirements. It truly is a co-evolution.

Notes

1. Hamel, Gary and Liisa Valikangas, "The Quest for Resilience", Harvard Business Review, September 2003.

2. Carr, Nicholas, "IT Doesn't Matter", Harvard Business Review, May 2003.

3. Hagel John and Mark Singer, "Unbundling the Corporation", Harvard Business Review, March-April 1999.

4. Pine II, Joseph and John H. Gilmore, "Welcome to the Experience Economy", Harvard Business Review, July-August 1998.

5. Fine, Charles H., <u>Clockspeed</u>, Perseus Books, 1998.

6. "Unbundling the Corporation"